

Memorandum

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

Washington 25, D. C. *Y. R. Josephson*

To : Directors (Except FPL and ITF)
From : H. R. Josephson, Director
Division of Forest Economics and Marketing Research
Subject: Forest Survey

4810
Date: November 16, 1962

Attached are results of a study on "Interpretation of Yield Table Data in Terms of Forest Survey Site Classifications," including a set of 42 tables which relate available yield table data to Forest Survey Site Classes. In a number of cases, Stations have made similar tabulations as a means of determining volume site classes from site index data. We hope that the attached tables, which in many cases have been "adjusted" to approximate Survey volume specifications, will nevertheless be useful in arriving at required site classifications.

We would appreciate your comments on this material and an indication of the applicability of these tables in your site classification procedures.



Enclosure

cc: All Regions

INTERPRETATION OF YIELD TABLE DATA IN TERMS OF
FOREST SURVEY SITE CLASSIFICATION

Introduction

To facilitate translation of yield table data into the site classes given in FSH 4810, the attached Table A was prepared for each species for which suitable yield tables are available. Table A shows the maximum mean annual increment in cubic feet per acre for major species by site index class for well-stocked stands. From Table A the attached Tables 1-42, inclusive, were prepared to show total heights of average dominant and codominant trees at the lower limits of site classes, by age class. In addition, Table B was prepared showing ages at culmination of m.a.i. in cubic feet and board feet. This table should prove useful to Timber Management personnel in determining technical rotation age.

The attached Table C compares, for selected species, the mean annual increment in cubic feet at cubic foot culmination with board foot culmination.

Basic Data

Several of the yield tables required adjusting so that maximum mean annual increment could be shown in terms of growing stock volume. Such adjustments were made if adequate data were available.

Yield tables for which adjustments were not needed

Yield tables were not adjusted if they were constructed for growing stock volume or very close to growing stock volume. Species in this category are listed below:

- Douglas-fir in Oregon and Washington
- Red alder
- Eastern white pine in New Hampshire
- Jack pine in Lake States
- Northern white cedar
- Red gum
- Red pine in Minnesota
- Slash pine
- Southern white cedar
- Yellow poplar

Yield tables adjusted

Several yield tables were adjusted because they included volume other than growing stock volume. The adjustments were made applying stand tables, cordwood to cubic foot conversions or percent distribution of cubic foot volume by diameter class tables.

The stand tables required assigning volumes to trees not of growing stock volume and deducting these volumes from the volume yields.

Cordwood yields for growing stock volume were converted to cubic foot yields using appropriate converting factors.

From percent distribution tables the proportion of cubic foot volume in growing stock volume may be determined. The product of this proportion times volume yield is the growing stock volume yield.

All of the above schemes are computed by age and site index classes. The following species are in this category:

- Douglas-fir in California
- Ponderosa pine
- Red fir
- Sitka spruce-Western hemlock in Alaska
- Sitka spruce-Western hemlock in Oregon
- Slash pine
- Western white pine
- White fir
- Eastern white pine in Wisconsin
- Loblolly pine
- Longleaf pine
- Pond pine
- Red spruce
- Sand pine
- Shortleaf pine
- White oak

Yield tables needing adjustment but with inadequate data

Many yields needed adjustment to show mean annual increments for growing stock volume but the yield tables lack sufficient data for making the adjustment. The following species are in this category:

- Mixed conifer in California
- Western hemlock in Alaska and in Oregon-Washington
- White spruce in Alberta, Canada
- Redwood
- Ash
- Aspen in Ontario and Minnesota
- Beech, birch and maple in Ontario and Vermont
- Eastern white pine in Ontario
- Jack pine in Ontario
- Northern red oak
- Red pine in Ontario
- Balsam fir
- Black spruce
- Virginia pine
- White birch
- White spruce in Michigan
- White spruce in northeast

Base year for site index classes

For the western species the data in Table A are for a 100-year base and for eastern species for a 50-year base. One exception is redwood. The site index curves for redwood were not adequate for changing the 50-year base to 100-year base.

Several western species (listed below) needed to be adjusted from the 50-year base to 100-year base:

- Douglas-fir in California
- Mixed conifers
- Red alder
- Western white pine
- White fir

One other species (White spruce in Alberta, Canada) needed to be adjusted from a 80-year base to 100-year base. The remaining western species needed no adjustment.

A few eastern species were adjusted to a 50-year base. Balsam fir, red spruce and white spruce in the Northeast were adjusted from a 65-year base to a 50-year base. Northern white cedar was adjusted from 160-year base to a 50-year base. All the yield tables for the several species in Ontario (15) were constructed at various base years. Hence, these species including aspen, beech-birch-maple, eastern white pine, jack pine, red-pine, black spruce and white birch were adjusted to a 50-year base. The rest of the remaining eastern species needed no adjustment.

The adjustment for base year was accomplished by determining the height at 100-year base or 50-year base for each original site index and by plotting that over the maximum mean annual increment corresponding to the original site index. From the curve so constructed the new maximum mean annual increments were read by 10-year site index classes and used in the preparation of Table A.

Forest Survey Site Tables

Data in Table A were used to prepare the tables showing total heights of dominant (or dominant and codominant) trees by Forest Survey Site Classes and age classes. For the species indicated, these tables can be applied in the field to estimate Forest Survey Site Class when age and height data are available. Classification of site for other species or where age-height data are not available must be determined by other methods.

Forest Survey Site Classes as shown in FSH 4810 have been subdivided as shown below to permit a more useful and sensitive classification of important species.

<u>Class</u>	<u>Potential average annual production at culmination of mean annual increment in cubic feet per acre, growing stock volume.</u>
Site A ₁ -	225 plus
Site A ₂ -	165 to 225
Site A ₃ -	120 to 165
Site B -	85 to 120
Site C -	50 to 85
Site D ₁ -	25 to 50
Site D ₂ -	less than 25

Although these tables are based on the best information available, some inconsistencies and limitations in the data should be kept in mind when applying the tables. The variations in maximum mean annual increment between some species as shown in Table A suggests the need for further studies to determine which variations are due to differences between species and which are due to methods of selecting or treating data. For example, the maximum mean annual increment for red fir in California, eastern white pine in Wisconsin, red spruce and southern white cedar look significantly out of line as compared to increments shown for other species. Based on a sampling study of the yield table data, it appears that for the lower site indexes the volumes shown in Table A may be 10-20 percent lower than they would be if all trees of all sizes were included. This difference between increment in all trees and in growing stock volume apparently is only about 3 percent for the higher site indexes.

The conversion of the values in Table A to the tables showing heights by Survey Site Class and age for each species was accomplished in the following steps:

1. 1. For each species a curve was constructed showing the maximum mean annual increment over the site index class using the values in Table A.
2. From the curve in Step 1, the site index was read corresponding to the lower limit of each Forest Survey Site Class (i.e., 25, 50, 85, 120, 165, and 225 maximum mean annual increment in cubic feet).

3. Using the site index obtained in step 2, reference was made to the site index curves or tables for the particular species. The height for the site index obtained in step 2 by 10-year age classes was read (or interpolated) from these curves.
4. Using the heights obtained from step 3, the table was prepared showing total heights by Survey Site Class and age.

Age at Culmination of Mean Annual Increment

Table B compares the ages at culmination of mean annual increment in cubic foot and in board feet for major species in well-stocked stands. Cubic-foot culminations are based on growing stock volume except as shown. Board-feet culminations are based on trees from variable minimums of 6.6 inches d.b.h. to 12 inches d.b.h. depending on availability of data. Because in future TM plans board foot volume is to be computed on all trees 7.0 inches and larger in d.b.h., an attempt was made to present data on that basis. In several cases data based upon 12 inches minimum d.b.h. are shown for comparison.

Comparisons of Mean Annual Increment in Cubic Feet

A few selected species were studied to compare culmination of mean annual increment in cubic feet for growing stock volume to mean annual increment in cubic feet for growing stock volume at board foot culmination. These comparisons were made at various site indexes and are shown in Table C. In general, the better sites show smaller differences in mean annual increment between cubic foot culmination and board foot culmination. This is more pronounced with western species than with eastern species. The difference is not as great when minimum d.b.h. is around 7 inches for board foot culmination as it is at larger minimums.

There would be significantly less cubic foot growth if board-foot rotations were based upon trees only 12 inches and larger in d.b.h. in board feet rather than upon 7 inches and larger, as shown for western species. Data are not available to permit a similar comparison for eastern species.

TABLE A - MEAN ANNUAL INCREMENT IN CUBIC FEET PER ACRE^{1/} FOR MAJOR SPECIES BY SIZE INDEX CLASS FOR GROWING STOCK VOLUME IN WELL-STOCKED STANDS

SPECIES ^{2/}	D. b. h. of smallest trees included inches	SITE INDEX CLASS, 100-year base																			
		20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210
		Maximum mean annual increment in cubic feet per acre																			
Western																					
DOUGLAS-FIR, California (1)	5.0					48	64	80	98	114	132	148	166	184	200	216	234	250	267	284	
Oregon & Washington (2)	5.0						54	65	78	91	107	123	138	151	163	174	184	193	201	207	
MIXED CONIFER, California (3) ^{3/}	2.0				57	65	78	90	103	115	130	145	160	174	195	210	228	245	263		
PONDEROSA PINE (4)	5.0		27	32	39	49	61	78	97	118	138	163	186	209	234						
RED ALDER (5)	5.5					45	60	70	85	100	110	125	140	155	170						
RED FIR (6)	5.0		70	84	96	110	125	140	155	171	185	211									
SITKA SPRUCE-WESTERN HEMLOCK, Alaska (8)	5.0					71	83	97	112	129	149	169	189	208							
Oregon & Washington (9)	5.0				60	73	85	101	118	138	156	178	200	220	240	255	271	285	300		
WESTERN HEMLOCK, Alaska (10)	1.5				57	73	88	105	122	140	158	175	194	207	222						
Oregon & Washington (10)	1.5							142	160	180	200	218	235	254	274	292	310	330	346		
WESTERN WHITE PINE (11)	5.0				62	71	80	90	100	110	120	128	137	146	155						
WHITE FIR (12)	5.0				45	55	68	85	105	128	148	170	190	205	217						
WHITE SPRUCE, Alberta, Canada (13)	4.0				19	24	31	39	47	56											

SITE INDEX CLASS, 50-year base

Maximum mean annual increment in cubic feet per acre

Western

REDWOOD (7)	2.6	213	238	260	285	310	338	364	393
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Eastern

ASH (14)	(Unknown)																				
ASPEN, Ontario (15)	3.5					41	59	72	81												
Minnesota (16)	4.0				22	43	64	81	94												
BALSAM FIR (30)	0.6		47	71	95	120															
BLACK SPRUCE (15)	3.6	16	26	38																	
BEECH, BIRCH, & MAPLE, Ontario (15)	3.6		17	24	33																
Vermont (17) 4/	2.6				46	74															
EASTERN WHITE PINE, New Hampshire (18)	5.0				43	58	76	97	120												
Ontario (15)	3.6	24	34	47	63	82															
Wisconsin (19)	4.6				90	121	151														
JACK PINE, Lake States (20)	5.0		17	31	41	51	60														
Ontario (15)	3.6				26	38	57														
LOBLOLLY PINE (21)	4.6					52	67	85	107	132	161	196									
LONGLEAF PINE (21)	4.6					38	52	69	86	108											
NORTHERN RED OAK (22) 5/	2.0				57	78															
NORTHERN WHITE CEDAR (23)	5.0	19	31	43																	
POND PINE (21)	4.6				33	43	54	66	79	95											
RED GUM (24)	4.6					41	60	84	107	136	168										
RED PINE, Minnesota (25)	5.0			36	50	77															
Ontario (15)	3.5			38	58	90															
RED SPRUCE (30)	4.6		40	77	105	127															
SAND PINE (21)	4.6			17	22	29	37	46													
SHORTLEAF PINE (21)	4.6			27	43	62	82	107	128	156											
SLASH PINE (21)	4.6				33	46	63	85	111	143											
SOUTHERN WHITE CEDAR (26)	5.0	12	30	53	79	109	137														
VIRGINIA PINE (27)	4.0				33	57	98	169													
WHITE BIRCH (15)	3.6			16	25	41															
WHITE OAK (28) 6/	4.6			20	31	43	52	62													
WHITE SPRUCE, Michigan (29) 7/	4.0	4	20	32	38	40															
Northeast (30)	0.6		48	73	96	118															
YELLOW POPLAR (31)	5.0				37	54	72	90	107	122											

1/ Volume yield of wood inside bark in well stocked stand. Main stem includes stump and tip except as indicated. Data adjusted to growing stock volume and to 100-year base for western species and 50-year base for eastern species when adjustment is needed and is desirable.

2/ Number in parenthesis after each species refers to attached bibliographic list of literature.

3/ Includes following species groups: ponderosa pine-fir, ponderosa pine-sugar pine, ponderosa pine-sugar pine-fir, sugar pine-fir, white fir-Douglas fir and white fir-red fir.

4/ Species are sugar maple 45%, yellow birch 18%, white ash 10%, beech 8%, other miscellaneous species 19%. Stands are of average density.

5/ Dominant species are red oak, red maple, white ash, yellow birch, poplar, basswood, paper birch, hard maple and are listed in order of frequency of occurrence.

6/ Species are upland oaks consisting of white oak 28%, black oak 19%, scarlet oak 17%, and red oak 14%.

7/ Species are white spruce, balsam fir, black spruce, and northern white cedar.

LITERATURE CITED IN TABLE A

Western Species

- (1) Douglas-fir in California. Schumacher, F. X.
1930. Yield, stand and volume tables for Douglas-fir in California. University of California, Berkeley. Bul. 491.
- (2) Douglas-fir. McArdle, R. E., Meyer, W. H. and Bruce, D.
1930. Rev. 1949. The yield of Douglas-fir in the Pacific Northwest. U. S. Dept. Agr. Tech. Bulletin 201.
- (3) mixed conifer, California. Dunning, D. and Reineke, L. H.
1933. Preliminary yield tables for second growth stands in California Pine Region. U.S.D.A. Tech. Bul. 354.
- (4) ponderosa pine. Meyer, W. H.
1938. Yield of even-aged stands of ponderosa pine. U. S. Dept. Agr. Tech. Bul. 630.
- (5) red alder. Worthington, N. P., Johnson, F. A., Stoebler, G. R. and Lloyd, W. S.
1960. Normal yield tables for red alder. Pacific Northwest Forest Experiment Station paper 36.
- (6) red fir. Schumacher, F. X.
1928. Yield, stand and volume tables for red fir in California. University of California, Berkeley. Bulletin 456.
- (7) redwood. Bruce, D.
1923. Preliminary yield tables for second-growth redwood. California Agr. Exp. Sta. Bul. 361.
- (8) Sitka spruce-western hemlock. Taylor, R. F.
1934. Yield of second-growth western hemlock-Sitka spruce stands in southeastern Alaska. U.S. Dept. Agr. Tech. Bul. 412.
- (9) Sitka spruce-western hemlock. Meyer, W. H.
1937. Yield of even-aged stands of Sitka spruce and western hemlock. U.S. Dept. Agr. Tech. Bul. 544.
- (10) western hemlock. Barnes, George H.
1961. Yield of even-aged stands of western hemlock. U.S.D.A. Tech. Bul. No. (being published). Pacific Northwest Forest Experiment Station.
- (11) western white pine. Haig, I. T.
1932. Second-growth yield, stand and volume tables for the western white pine type. U.S. Dept. Agr. Tech. Bul. 323.

- (12) white fir. Schumacher, F. X.
1926. Yield, stand and volume tables for white fir in the California Pine Region. Univ. of California, Berkeley. Bul. 407.
- (13) white spruce and trembling aspen. MacLead, W. K. and Blyth, A. W.
1955. Yield of even-aged fully stocked spruce-poplar stands in Alberta. Dept. of Northern Affairs and National Resources. Ontario, Canada. Tech. Note 18.

Eastern Species

- (14) ash. Patton, R. T.
1922. A study of growth and yield of red oak and white ash. Bul. 4. Harvard Forest, Petersham, Massachusetts.
- (15) black spruce, jack pine, aspen, white birch, tolerant hardwoods, white pine and red pine. Plonski, W. L.
1960. Normal yield tables for Ontario. Ontario Dept. of Lands and Forests. Ottawa, Canada
- (16) aspen. Kittredge, J. Jr. and Gevorkiantz, S. R.
1929. Forest possibilities of aspen lands in the Lake States. Minnesota Agr. Exp. Sta. Tech. Bul. 60.
- (17) beech, yellow birch and sugar maple. Howes, A. F. and Chandler, B. J.
1914. The management of second growth hardwoods in Vermont. Vermont Agr. Exp. Sta. Bul. 176.
- (18) eastern white pine. Graves, H. S. ^{Petersham}
1914. White pine under forest management. U.S.D.A. Bul. 13.
- (19) eastern white pine. Gevorkiantz, S. R. and Zon, R.
1930. Second-growth white pine in Wisconsin. Its growth yield and commercial possibilities. Agr. Exp. Sta. Bul. 98. Madison, Wisconsin.
- (20) jack pine. Gevorkiantz, S. R.
1947. Growth and yield of jack pine in the Lake States. Lake States Forest Exp. Sta., Station Paper 7.
- (21) loblolly, longleaf, sand, slash, shortleaf, and pond pine. Schumacher, F. X. and Coile, T. S.
1960. Growth and yields of natural stands of the southern pines. T. S. Coile, Inc. Durham, North Carolina.
- (22) northern red oak. Spaeth, N. J.
1920. Growth study and normal yield tables for second growth hardwood stands in Central New England. Bul. 2. Harvard Forest, Petersham, Massachusetts.

- (23) northern white cedar. Gevorkiantz, S. R. and Duerr, W. A.
1939. Volume and yield of northern white cedar. Lake
States For. Exp. Sta., progress report.
- (24) red gum. Winters, R. K. and Osborne, J. G.
1935. Growth and yield of second-growth red gum in fully
stocked stands on alluvial lands in the south. Southern
For. Exp. Sta. Occ. paper 54.
- (25) red pine. Eyre, F. H. and Zehngraff, P.
1948. Red pine management in Minnesota. U.S.D.A. Circular 778.
- (26) southern white cedar. Korstian, C. F. and Brush, W. D.
1931. Southern white cedar. U.S. Dept. Agr. Tech. Bul. 251.
- (27) Virginia pine. Nelson, T. C., Clutter, J. L., and Chaiken, L. E.
1961. Yields of Virginia pine. Southeastern For. Exp. Sta.
Station Paper 124.
- (28) white oak. Schnur, G. L.
1937. Yield, stand and volume tables for even-aged upland
oak forests. U.S. Dept. Agr. Tech. Bul. 560.
- (29) white spruce, black spruce and balsam fir. Bowman, A. B.
1944. Growth and occurrence of spruce and fir pulpwood lands
in northern Michigan. Agr. Exp. Sta. Tech. Bul. 188
- (30) white spruce, red spruce and balsam fir. Meyer, W. H.
1929. Yields of second-growth of spruce and fir in the
northeast. U.S. Dept. Agr. Tech. Bul. 142.
- (31) yellow poplar. McCarthy, E. F.
1933. Yellow poplar characteristics, growth and management.
U.S. Dept. Agr. Tech. Bul. 356.

Table 1.--Total heights of average dominant trees at lower limits
of Forest Survey site classes, by age classes.
DOUGLAS-FIR, California

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	-	-	-	-	-	-
30	-	26	43	54	64	82
40	-	35	54	68	82	103
50	-	43	64	80	96	120
60	-	50	73	89	109	137
70	-	54	79	98	117	149
80	-	58	85	104	126	160
90	-	60	89	110	133	168
100	-	62	93	114	140	175
110	-	64	96	118	145	181
120	-	66	99	122	150	187
130	-	68	102	125	153	191
140	-	70	105	128	156	195
150	-	72	107	130	158	198
160	-	73	108	132	159	200

Table 2.--Total heights of average dominant and codominant trees at lower limits of Forest Survey site classes, by age classes.

DOUGLAS-FIR, Washington and Oregon

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	-	20	28	36	42	-
30	-	33	48	59	70	-
40	-	45	64	77	97	-
50	-	52	74	90	112	-
60	-	59	83	99	126	-
70	-	64	90	108	137	-
80	-	68	96	116	147	-
90	-	72	101	123	155	-
100	-	75	106	128	162	-
110	-	78	110	133	167	-
120	-	80	112	136	172	-
130	-	82	115	139	175	-
140	-	83	116	142	178	-
150	-	84	119	143	181	-
160	-	85	120	145	183	-

Table 3.--Total heights of average dominant trees at lower limits
of Forest Survey site classes, by age classes.
MIXED CONIFER, California

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	-	10	17	22	29	37
30	-	16	26	35	45	58
40	-	22	35	47	62	78
50	-	27	44	59	77	97
60	-	33	53	70	91	115
70	-	38	60	79	104	131
80	-	42	66	88	116	146
90	-	45	71	95	125	157
100	-	48	76	102	133	168
110	-	51	80	110	140	167
120	-	53	84	117	147	185
130	-	56	88	120	153	193
140	-	58	91	122	159	201
150	-	60	95	126	165	208

Table 4.--Total heights of average dominant and codominant trees at lower limits of Forest Survey site classes, by age classes.

PONDEROSA PINE

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	6	16	27	35	45	58
30	11	26	39	51	64	78
40	16	36	51	63	77	97
50	21	44	60	73	89	109
60	26	51	69	81	99	120
70	30	57	76	89	108	130
80	34	62	83	97	116	139
90	37	67	89	104	123	148
100	40	71	94	110	130	156
110	42	75	99	116	137	164
120	44	78	104	122	144	171
130	45	81	109	128	151	178
140	46	84	113	133	157	185
150	47	87	118	138	163	191
160	48	90	122	143	169	197
170	48	93	126	147	174	202
180	49	95	129	151	179	207
190	49	97	132	154	183	212
200	50	99	134	157	187	216

Table 5.--Total heights of average dominant and codominant trees at lower limits of Forest Survey site classes, by age classes.

RED ALDER

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
10	-	23	31	39	-	-
20	-	38	50	63	-	-
30	-	48	63	79	-	-
40	-	55	73	91	-	-
50	-	60	80	100	-	-
60	-	64	86	107	-	-
70	-	68	90	113	-	-
80	-	70	94	117	-	-

Table 6.--Total heights of average dominant trees at lower limits of Forest Survey site classes, by age classes.

RED FIR

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	-	-	-	-	-	-
30	-	-	10	16	26	30
40	-	-	16	25	34	45
50	-	-	21	35	48	62
60	-	-	28	44	60	78
70	-	-	33	53	74	94
80	-	-	39	61	82	109
90	-	-	43	69	97	124
100	-	-	48	77	106	137
110	-	-	52	84	116	149
120	-	-	56	90	124	160
130	-	-	60	95	130	170
140	-	-	62	99	136	178
150	-	-	64	102	141	183
160	-	-	66	104	145	187
170	-	-	68	105	150	190

Table 7.--Total heights of average dominant and codominant trees at lower limits of Forest Survey site classes, by age classes.

REDWOOD

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
10	-	-	-	-	-	18
20	-	-	-	-	-	34
30	-	-	-	-	-	48
40	-	-	-	-	-	63
50	-	-	-	-	-	75
60	-	-	-	-	-	87
70	-	-	-	-	-	-
80	-	-	-	-	-	-

Table 8.--Total heights of average dominant trees at lower limits
of Forest Survey site classes, by age classes.

SITKA SPRUCE - WESTERN HEMLOCK, Alaska

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	-	-	-	-	-	-
30	-	20	35	43	53	66
40	-	25	43	55	66	83
50	-	30	51	65	79	98
60	-	34	58	73	90	113
70	-	39	65	81	100	125
80	-	42	71	89	110	138
90	-	45	77	96	118	148
100	-	48	82	103	126	158
110	-	51	87	109	134	168
120	-	54	92	114	140	177
130	-	56	96	119	147	186
140	-	59	99	125	153	193
150	-	61	103	130	159	200
160	-	-	-	-	-	-

Table 9.--Total heights of average dominant and codominant trees at lower limits of Forest Survey site classes, by age classes.

SITKA SPRUCE - WESTERN HEMLOCK, Oregon and Washington

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	-	13	17	21	27	32
30	-	23	30	38	46	57
40	-	31	41	52	64	78
50	-	38	51	64	78	95
60	-	44	58	74	89	111
70	-	49	64	82	100	124
80	-	53	70	90	109	133
90	-	56	75	96	117	143
100	-	60	80	102	124	152
110	-	63	84	107	131	160
120	-	66	88	112	137	167
130	-	69	92	117	143	175
140	-	72	96	122	148	181
150	-	74	99	126	153	188
160	-	77	102	130	158	194
170	-	79	105	134	162	200
180	-	81	107	137	166	204
190	-	82	109	140	170	208
200	-	84	111	143	173	212

Table 10.--Total heights of average dominant trees at lower limits
of Forest Survey site classes, by age classes.

WESTERN WHITE PINE

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	-	6	10	14	20	-
30	-	12	21	30	46	-
40	-	20	31	45	64	-
50	-	24	41	60	86	-
60	-	29	50	73	105	-
70	-	35	60	84	125	-
80	-	40	70	98	140	-
90	-	44	76	108	155	-
100	-	47	82	118	170	-
110	-	50	87	124	180	-
120	-	52	91	130	190	-
130	-	54	95	135	195	-
140	-	56	98	140	200	-
150	-	58	101	143	205	-
160	-	60	104	146	210	-

Table 11.--Total heights of average dominant trees at lower limits
of Forest Survey site classes, by age classes.
WHITE FIR, California

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	-	-	-	-	-	-
30	-	-	-	-	-	-
40	-	21	30	37	44	-
50	-	32	48	59	72	-
60	-	41	59	72	88	-
70	-	46	67	81	99	-
80	-	50	72	88	107	-
90	-	53	77	93	113	-
100	-	56	80	98	118	-
110	-	58	83	102	123	-
120	-	60	86	105	127	-
130	-	62	89	108	130	-
140	-	63	91	110	134	-
150	-	64	93	112	137	-

Table 12.--Total heights of average dominant trees at lower limits of Forest Survey site classes, by age classes.
 ○ WHITE SPRUCE, Alberta, Canada

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	3	16	-	-	-	-
30	10	27	-	-	-	-
40	18	40	-	-	-	-
50	27	52	-	-	-	-
60	37	65	-	-	-	-
70	47	76	-	-	-	-
80	56	86	-	-	-	-
90	62	94	-	-	-	-
100	68	100	-	-	-	-
110	73	105	-	-	-	-
120	77	110	-	-	-	-
130	80	114	-	-	-	-
140	83	117	-	-	-	-
150	85	119	-	-	-	-
160	87	121	-	-	-	-
170	88	122	-	-	-	-
180	89	123	-	-	-	-
190	90	124	-	-	-	-

Table 13.--Total heights of average dominant and codominant trees at lower limits of Forest Survey site classes, by age classes.

WESTERN HEMLOCK, Alaska

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
10	--	4	5	6	7	9
20	-	12	17	21	26	34
30	-	22	29	37	47	62
40	-	29	41	51	65	85
50	-	35	50	63	79	103
60	-	42	58	73	92	121
70	-	46	64	80	102	134
80	-	49	69	87	110	144
90	-	53	74	93	117	153
100	-	56	78	98	124	162
110	-	59	82	102	129	169
120	-	61	84	106	133	174
130	-	62	86	108	136	179
140	-	64	88	110	139	182
150	-	65	89	112	141	185
160	-	66	91	113	143	187
180	-	66	93	115	146	191
200	-	67	94	117	148	194
220	-	67	94	118	150	195
240	-	68	95	119	151	196
260	-	68	95	120	151	197
280	-	69	96	120	152	198
300	-	69	96	121	152	199

Table 14.---Total heights of average dominant and codominant trees at lower limits of Forest Survey site classes, by age classes.

WESTERN HEMLOCK, Oregon and Washington

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limits of site class					
10	-	4	4	5	6	8
20	-	11	15	19	24	30
30	-	21	26	33	43	55
40	-	27	36	46	58	75
50	-	32	45	57	71	92
60	-	39	52	66	83	107
70	-	43	57	72	92	118
80	-	46	62	78	100	127
90	-	50	66	83	106	136
100	-	52	70	88	112	144
110	-	55	73	92	117	150
120	-	57	75	95	120	155
130	-	57	77	97	123	159
140	-	59	79	99	125	161
150	-	60	80	101	127	164
160	-	61	81	103	129	166
180	-	61	83	105	132	170
200	-	62	84	106	134	191
220	-	62	84	107	135	174
240	-	63	85	107	136	175
260	-	63	85	108	136	175
280	-	64	86	108	137	176
300	-	64	86	108	137	176

Table 15.--Total heights of average dominant and codominant trees at lower limits of Forest Survey site classes, by age classes.

ASPEN, Ontario

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	16	25	45	-	-	-
30	26	36	61	-	-	-
40	35	46	75	-	-	-
50	43	55	86	-	-	-
60	49	62	94	-	-	-
70	54	67	100	-	-	-
80	58	70	103	-	-	-
90	60	72	106	-	-	-
100	62	73	107	-	-	-

Table 16.--Total heights of average dominant trees at lower limits
of Forest Survey site classes, by age classes.
ASPEN, Minnesota

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	23	31	42	-	-	-
30	29	40	53	-	-	-
40	35	48	65	-	-	-
50	40	54	73	-	-	-
60	44	59	79	-	-	-
70	47	63	85	-	-	-
80	49	67	90	-	-	-

Table 17.--Total heights of average dominant and codominant trees at lower limits of Forest Survey site classes, by age classes.

BALSAM FIR

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	7	9	11	13	-	-
30	11	17	24	30	-	-
40	16	25	36	47	-	-
50	20	32	46	61	-	-
60	22	36	52	68	-	-
70	24	38	56	73	-	-
80	25	40	58	77	-	-
90	26	41	60	79	-	-

Table 18.--Total heights of average dominant and codominant trees
at lower limits of Forest Survey site classes, by age
classes

BEECH, BIRCH, AND MAPLE, Ontario

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	15	-	-	-	-	-
30	24	-	-	-	-	-
40	33	-	-	-	-	-
50	40	-	-	-	-	-
60	47	-	-	-	-	-
70	52	-	-	-	-	-
80	56	-	-	-	-	-
90	59	-	-	-	-	-
100	62	-	-	-	-	-
110	-	-	-	-	-	-
120	65	-	-	-	-	-
130	-	-	-	-	-	-
140	66	-	-	-	-	-
150	-	-	-	-	-	-
160	67	-	-	-	-	-
170	-	-	-	-	-	-
180	67	-	-	-	-	-

Table 19.--Total heights of average dominant and codominant trees
at lower limits of Forest Survey site classes, by age
classes.

BLACK SPRUCE, Ontario

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	10	21	-	-	-	-
30	17	32	-	-	-	-
40	24	42	-	-	-	-
50	30	50	-	-	-	-
60	35	56	-	-	-	-
70	38	61	-	-	-	-
80	42	65	-	-	-	-
90	45	68	-	-	-	-
100	48	72	-	-	-	-
110	50	74	-	-	-	-
120	52	76	-	-	-	-
130	54	78	-	-	-	-
140	56	79	-	-	-	-
150	57	80	-	-	-	-

Table 20.--Total heights of average dominant trees at lower limits
of Forest Survey site classes, by age classes.
EASTERN WHITE PINE, New Hampshire

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	-	11	20	27	-	-
30	-	22	37	47	-	-
40	-	34	52	66	-	-
50	-	45	65	80	-	-
60	-	54	75	90	-	-
70	-	62	83	99	-	-
80	-	67	90	107	-	-
90	-	72	96	114	-	-
100	-	75	100	119	-	-
	5	11	3	2	1	

Table 21.--Total heights of average dominant and codominant trees at lower limits of Forest Survey site classes, by age classes.

EASTERN WHITE PINE, Ontario

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	6	10	14	-	-	-
30	10	20	33	-	-	-
40	16	31	49	-	-	-
50	22	41	62	-	-	-
60	29	50	78	-	-	-
70	35	57	87	-	-	-
80	40	63	95	-	-	-
90	45	68	101	-	-	-
100	49	73	106	-	-	-
110	53	77	111	-	-	-
120	55	80	114	-	-	-
130	58	82	117	-	-	-
140	60	84	120	-	-	-
150	61	86	122	-	-	-
160	62	87	123	-	-	-
170	63	88	125	-	-	-
180	64	89	126	-	-	-

Table 22.--Total heights of average dominant trees at lower limits
of Forest Survey site classes, by age classes.
EASTERN WHITE PINE, Wisconsin

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	-	-	9	14	19	-
30	-	-	26	32	42	-
40	-	-	37	47	55	-
50	-	-	48	60	75	-
60	-	-	57	71	88	-
70	-	-	63	80	102	-
80	-	-	72	88	112	-
90	-	-	76	94	118	-
100	-	-	80	99	124	-
110	-	-	83	103	128	-
120	-	-	85	106	132	-

Table 23.--Total heights of average dominant trees at lower limits of Forest Survey site classes, by age classes.
JACK PINE, Lake States

Age class in years	Forest Survey site classes					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	14	26	-	-	-	-
30	23	40	-	-	-	-
40	30	50	-	-	-	-
50	35	59	-	-	-	-
60	39	68	-	-	-	-
70	43	73	-	-	-	-
80	45	78	-	-	-	-

Table 24.--Total heights of average dominant and codominant trees at lower limits of Forest Survey site classes, by age classes.

JACK PINE, Ontario

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	15	26	-	-	-	-
30	25	39	-	-	-	-
40	34	49	-	-	-	-
50	40	57	-	-	-	-
60	45	63	-	-	-	-
70	48	67	-	-	-	-
80	50	69	-	-	-	-
90	51	71	-	-	-	-
100	51	72	-	-	-	-

Table 25.--Total heights of average dominant and codominant trees at lower limits of Forest Survey site classes, by age classes.

LOBLOLLY PINE

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	33	38	51	61	71	-
30	42	48	66	78	91	-
40	47	54	74	88	102	-
50	51	60	80	95	110	-
60	54	63	84	100	116	-
70	56	64	87	104	121	-
80	57	66	90	106	124	-

Table 26.--Total heights of average dominant and codominant trees at lower limits of Forest Survey site classes, by age classes.

LONGLEAF PINE

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	26	36	48	-	-	-
30	38	52	67	-	-	-
40	45	62	80	-	-	-
50	49	68	89	-	-	-
60	52	72	94	-	-	-
70	54	75	99	-	-	-
80	56	78	102	-	-	-

Table 27.--Total heights of average dominant and codominant trees at lower limits of Forest Survey site classes, by age classes.

NORTHERN WHITE CEDAR

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	10	18	-	-	-	-
30	16	31	-	-	-	-
40	21	40	-	-	-	-
50	25	46	-	-	-	-
60	28	53	-	-	-	-
70	31	59	-	-	-	-
80	34	63	-	-	-	-
90	36	68	-	-	-	-
100	38	73	-	-	-	-
110	39	76	-	-	-	-
120	41	78	-	-	-	-
130	42	80	-	-	-	-
140	43	82	-	-	-	-
150	44	84	-	-	-	-
160	45	85	-	-	-	-

Table 28.--Total heights of average dominant and codominant trees
at lower limits of Forest Survey site classes, by age
classes.

POND PINE

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	27	44	62	-	-	-
30	35	55	77	-	-	-
40	39	61	86	-	-	-
50	42	66	93	-	-	-
60	44	69	97	-	-	-
70	46	71	101	-	-	-
80	47	73	103	-	-	-

Table 29.--Total heights of average dominant trees at lower limits
of Forest Survey site classes, by age classes.
RED GUM

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
10	-	15	22	46	-	-
20	23	36	48	74	-	-
30	39	52	66	92	-	-
40	52	65	79	107	-	-
50	61	75	90	119	-	-
60	68	83	98	128	-	-
70	-	89	105	136	-	-
80	-	94	110	143	-	-
90	-	99	115	-	-	-
100	-	-	119	-	-	-

Table 30.--Total heights of average dominant trees at lower limits
of Forest Survey site classes, by age classes.

RED PINE

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	9	16	19	-	-	-
30	12	30	37	-	-	-
40	23	41	50	-	-	-
50	28	50	62	-	-	-
60	33	57	71	-	-	-
70	37	63	76	-	-	-
80	39	68	82	-	-	-
90	42	73	87	-	-	-
100	44	77	96	-	-	-

Table 31.--Total heights of average dominant and codominant trees at lower limits of Forest Survey site classes, by age classes.

RED PINE, Ontario

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	10	20	30	-	-	-
30	18	30	43	-	-	-
40	25	39	53	-	-	-
50	32	46	62	-	-	-
60	36	51	67	-	-	-
70	38	54	72	-	-	-
80	41	57	76	-	-	-
90	42	59	79	-	-	-
100	44	61	82	-	-	-
110	45	62	84	-	-	-
120	45	63	86	-	-	-
130	45	64	87	-	-	-
140	45	64	88	-	-	-
150	96	65	89	-	-	-
160	46	65	89	-	-	-

Table 32.--Total heights of average dominant and codominant trees at lower limits of Forest Survey site classes, by age classes.

RED SPRUCE

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	6	7	9	10	-	-
30	13	14	19	24	-	-
40	20	23	32	40	-	-
50	27	32	44	56	-	-
60	32	39	53	68	-	-
70	35	43	58	76	-	-
80	37	45	62	81	-	-
90	38	46	63	83	-	-
100	38	47	65	85	-	-
110	39	48	66	86	-	-

Table 33.--Total heights of average dominant and codominant trees
at lower limits of Forest Survey site classes, by age
classes.

SAND PINE

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	26	41	-	-	-	-
30	39	60	-	-	-	-
40	48	72	-	-	-	-
50	54	82	-	-	-	-
60	58	88	-	-	-	-
70	62	94	-	-	-	-
80	65	98	-	-	-	-

Table 34.--Total heights of average dominant and codominant trees at lower limits of Forest Survey site classes, by age classes.

SHORTLEAF PINE

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	24	34	46	54	66	-
30	30	42	56	68	82	-
40	34	49	65	77	94	-
50	38	54	72	86	104	-
60	41	58	78	93	112	-
70	44	62	83	100	120	-
80	47	66	88	106	127	-

Table 35.--Total heights of average dominant and codominant trees at lower limits of Forest Survey site classes, by age classes.

SLASH PINE

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	26	41	55	68	-	-
30	34	52	67	81	-	-
40	39	58	75	88	-	-
50	43	62	80	93	-	-
60	46	65	84	96	-	-
70	48	67	86	98	-	-
80	49	69	88	100	-	-

Table 38.--Total heights of average dominant and codominant trees
at lower limits of Forest Survey site classes, by age
class.

WHITE BIRCH, Ontario

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
20	18	27	-	-	-	-
30	32	42	-	-	-	-
40	42	54	-	-	-	-
50	50	63	-	-	-	-
60	56	70	-	-	-	-
70	58	74	-	-	-	-
80	60	77	-	-	-	-
90	61	78	-	-	-	-

Table 39.--Total heights of average dominant and codominant trees at lower limits of Forest Survey site classes, by age classes.

WHITE OAK

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limit of site class					
10	10	20	-	-	-	-
20	19	34	-	-	-	-
30	28	46	-	-	-	-
40	37	57	-	-	-	-
50	44	67	-	-	-	-
60	49	75	-	-	-	-
70	53	79	-	-	-	-
80	55	83	-	-	-	-
90	57	86	-	-	-	-
100	58	88	-	-	-	-

Table 40.--Total heights of average dominant trees at lower limits
of Forest Survey site classes, by age classes

WHITE SPRUCE, Michigan

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limits of site class					
20	14	-	-	-	-	-
30	20	-	-	-	-	-
40	28	-	-	-	-	-
50	34	-	-	-	-	-
60	37	-	-	-	-	-
70	39	-	-	-	-	-
80	41	-	-	-	-	-
90	42	-	-	-	-	-
100	43	-	-	-	-	-
110	44	-	-	-	-	-
120	45	-	-	-	-	-
130	45	-	-	-	-	-
140	46	-	-	-	-	-
150	46	-	-	-	-	-
160	47	-	-	-	-	-

Table 41.--Total heights of average dominant and codominant trees at lower limits of Forest Survey site classes, by age classes.

WHITE SPRUCE, Northeast

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limits of site class					
20	7	8	11	12	-	-
30	11	16	23	29	-	-
40	15	23	35	46	-	-
50	20	30	46	60	-	-
60	22	33	53	69	-	-
70	23	36	57	74	-	-
80	24	38	60	78	-	-
90	25	39	62	82	-	-

Table 42.--Total heights of average dominant and codominant trees at lower limits of Forest Survey site classes, by age classes.

YELLOW POPLAR

Age class in years	Forest Survey site class					
	D ₁	C	B	A ₃	A ₂	A ₁
	Total height in feet at lower limits of site class					
10	20	27	35	43	55	-
20	35	46	59	74	91	-
30	44	56	72	89	112	-
40	50	63	81	100	125	-
50	53	68	87	108	135	-
60	56	72	91	113	142	-

TABLE B - COMPARISON OF AGE CLASS AT CULMINATION/^{3/}MEAN ANNUAL INCREMENT IN CUBIC FEET AND BOARD FEET ^{1/} FOR MAJOR SPECIES, IN WELL STOCKED STANDS.

SPECIES ^{2/}	D. B.H. ^{3/} or smallest tree included inches	SITE INDEX CLASS, 100-year base																			
		20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210
		Age class in years at culmination of mean annual increment																			
<u>Western</u>																					
DOUGLAS-FIR, California (1)	5.0c 8.0c							70	60	50	50	50	40	40	40	40	40	40	40		
Oregon & Washington (2)	5.0c 7.0c 12.0c							100	90	80	80	80	70	70	70	60	60	50	50	60	60
MIXED CONIFER, California (3)	2.0c 8.0c				70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
PONDEROSA PINE (4)	5.5c 6.6b 11.6b		120	100	60	80	70	60	50	50	50	40	40	40	40	40	100	100	100		
RED ALDER (5)	5.5c 9.5b				150	150	150	140	140	130	130	120	110	100	90	90	90	90	90	90	90
RED FIR (6)	5.0c 8.0b		140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140
SITKA SPRUCE - WESTERN HEMLOCK, Alaska (8)	4.6c 7.0b							100	90	80	70	70	70	70	70	70	70	70	70	70	70
Oregon & Washington (9)	4.6c 6.6b				110	100	90	70	70	70	70	70	70	70	70	70	70	70	70	70	70
WESTERN HEMLOCK, Alaska (10)	1.5c 6.5b				60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Oregon & Washington (10)	1.5c 6.5b 11.5b				110	110	100	100	90	90	80	80	80	70	70	70	70	70	70	70	70
WESTERN WHITE PINE (11)	5.6c 6.6b 12.6b				130	130	120	110	100	100	100	100	100	100	100	100	100	100	100	100	100
WHITE FIR (12)	5.0c 8.0b				70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
WHITE SPRUCE (13)	4.0c 7.0b				150	140	120	110	110	90	90	90	90	90	90	90	90	90	90	90	90

		SITE INDEX CLASS, 50-year base				
		Age class in years at culmination of mean annual increment				
<u>Western</u>						
REDWOOD (7)	2.6c 8.0c	40	40	45	45	45
		55	55	55	55	55

<u>Eastern</u>											
BALSAW FIR (30)	0.6c 7.0c	50	50	50	50						
EASTERN WHITE PINE, Wisconsin (19)	4.6c 7.0c	80	80	70	70						
JACK PINE (20)	5.0c 9.0c	40	40	40	40						
LOBLOLLY PINE (21)	4.6c 9.0c	50	60	70	70						
LONGLEAF PINE (21)	4.6c 9.0c			30	30	30	30	30	30	30	30
NORTHERN RED OAK (22)	2.0c 7.0c			60	60	60	60	60	60	60	60
POND PINE (21)	4.6c 9.0c			40	40	40	40	40	40	40	40
RED GUM (24)	4.6c 6.5c			80	80	80	80	80	80	80	80
RED PINE (25)	5.0c 8.0c			30	30	20	20	30	30	30	30
RED SPRUCE (30)	4.5c 7.0c			80	80	80	80	80	80	80	80
SHORTLEAF PINE (21)	4.6c 9.0c			50	40	30	20	20	20	20	20
SLASH PINE (21)	4.6c 9.0c			80	80	80	80	80	80	80	80
SOUTHERN WHITE CEDAR (26)	5.0c 8.0c	100	90	80	70	60	50	40	40	40	40
WHITE OAK (26)	4.6c 7.0c			100	100	100	100	100	100	100	100
WHITE SPRUCE (30)	0.6c 7.0c			60	60	60	60	60	60	60	60

^{1/} International 1/4-inch rule.

^{2/} Number in parenthesis after species refers to attached bibliographic list of literature.

^{3/} Letter after d.b.h. refers to units of measure, i.e., "c" is cubic feet and "b" is board feet.

Table C - Ratio of culmination mean annual increment in cubic foot of growing stock to mean annual increment in cubic foot at board foot culmination for a few selected species by site index classes for well stocked stands.

Species	Min. DBH for Bd.Ft. inches	Site Index Class 100-year Base								
		40	60	80	100	120	140	160	180	200
		Ratio -								
Douglas-fir	12.0	-	-	.74	.77	.87	.93	.93	.96	.98
	7.0	-	-	.95	.96	.98	.99	.99	1.00	1.00
Ponderosa pine	11.6	-	.63	.70	.73	.77	.82	.87	-	-
	6.6	-	.70	.80	.83	.91	.94	.97	-	-
Sitka spruce- western hemlock	11.6	-	.70	.72	.78	.87	.92	.94	.97	.99
	6.6	-	.83	.89	.94	.95	.97	.99	.99	1.00
		Site Index Class, 50-year Base								
Loblolly pine	9.0	-	.79	.78	.93	.94				
Longleaf pine	9.0	-	.90	.95	.95	-				
Pond pine	9.0	-	.75	.84	.87	-				
Shortleaf pine	9.0	.96	.81	.71	.75	-				
Slash pine	9.0	-	.78	.78	.82	-				
Red gum	6.6	-	-	.95	.97	.93				
Jack pine	9.0	.84	.77	-	-	-				
White pine (New England)	5.0	.95	.97	.99	-	-				
White pine (Wisconsin)	7.0	.83	.97	-	-	-				